

CHAOTIC PLASMA PHASE SYNCHRONIZED MODEL

Justin A. Bishop (climber_a8rz@hotmail.com)

George H. Rutherford* (ghr@phy.ilstu.edu)

Epaminondas Rosa, Jr.* (erosa@phy.ilstu.edu)

Department of Physics, Illinois State University
Normal, IL 61790-4560

Two oscillators are said to be phase synchronized when they are in step with each other while their amplitudes remain completely uncorrelated. Here we are studying a model for experimental phase synchronization of chaotic plasma. Our goal is to develop a better understanding of the phase synchronization process and how it evolves depending on different values of control parameters. To model our chaotic system we are using a numerical simulation consisting of three differential equations with one equation having a nonlinear term, which is responsible for the chaotic behavior of our system. We are trying to force our system by adding a sinusoidal wave, which has the same dominant frequency as our chaotic system. This model is based on a true experimental setup where a plasma discharge tube is forced with a low amplitude periodic oscillator.